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10/685,983	10/15/2003	Yuriy Zakharov	G&C 184.2-US-11	7100

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HOWARD HUGHES CENTER	2193	

6701 CENTER DRIVE WEST, SUITE 1050
LOS ANGELES, CA 90045

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/12/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>05 February 2007</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-122</u> is/are pending in the application.

    4a) Of the above claim(s) <u>74 and 81-122</u> is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-73 and 75-80</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>15 October 2003</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All b)☐ Some * c)☐ None of:

      1.☒ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date <u>3/8/05;11/7/05</u>.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

1.   This communication is responsive to Amendment filed 10/15/2003 and 02/05/2007.

2.   Claims 1-122 are pending in this application. Claims 1, 37-39, 72-73, 75, and 80 are

independent claims. In Amendment, claims 74 and 81-122 are withdrawn from consideration

due to Restriction/Requirement. This Office Action is made non-final.

Election/Restrictions

3.   Applicant's election with traverse of Group I claims 1-73 and 75-80 in the reply filed on

02/05/2007 is acknowledged. The traversal is on the ground(s) that the group is linked by a

common inventive concept and there is no serious burden on the examiner to exam the groups.

This is not found persuasive because:

        The examiner respectfully submits that each of group of claims disclose uniquely

an invention even thought they all solving system of linear equation but approaching

differently in solving the system of linear equations as clearly addressed in the previous

Restriction/Requirement. In addition, there is a serious burden for examiner to exam at

once all eight different inventions corresponding to different aspect of the invention

wherein each invention discloses uniquely method of solving the system of linear

equations.

The requirement is still deemed proper and is therefore made FINAL.

Specification

4.   Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

5.   The abstract of the disclosure is objected to because the abstract should not disclose the

exact claim. Correction is required. See MPEP § 608.01(b).

6.   The disclosure is objected to because of the following informalities:

The applicant is advised to update information cited under the "Cross Reference

to Related Applications" in page 1 of the original specification.

Further, the applicant is advised to fix claims 21 and 57 for spacing problem with

the claims.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

7.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8.   Claims 1-73 and 75-80 are rejected under 35 U.S.C. 112, second paragraph, as being

indefinite for failing to particularly point out and distinctly claim the subject matter which

applicant regards as the invention.

Re claim 1, the limitation step d "each estimate value is sufficiently close to an accurate value of the respective unknown variable" is unclear because the accurate value of the system of linear equation is unknown. Thus, we do not know when the estimate value is close to the unknown value in order to exit the repeating step. For examination purposes, the examiner considers the repeating step d until the error of estimate value is relatively small to indicate convergence result. Claims 37-39, 72-73, 75, and 80 have the same rejection.

Re claim 37, it is unclear whether the claim is the apparatus claim of the method claim because the claim discloses a mix of apparatus and method of preceding claim. For examination purposes, the examiner considers the claim as an apparatus claim with all necessary components to carry method steps in the depended claim. Claims 38 and 72-73 have the same rejection.

Thus, claims 2-36, 40-71, and 76-79 are also rejected for being dependent on the rejected base claims 1, 39, and 75.

Claim Rejections - 35 USC § 101

9.   35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

10.   Claims 1-73 and 75-80 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 1-73 and 75-80 cite a method, system, and program for solving a system of linear equations in accordance with a predetermined mathematical algorithm. In order

for claims to be statutory, claims must either include a practical/physical application or a concrete, useful, and tangible result. However, claims 1-73 and 75-80 merely disclose steps/components for solving a vector of unknown variables in system of linear equations without further disclosing a practical/physical application or a useful and tangible result. In addition, claims 38 and 73 are software per se. embodied in non-tangible medium as a data carrier. Therefore, claims 1-73 and 75-80 are directed to non-statutory subject matter.

Claim Rejections - 35 USC § 102

11.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

12.   Claims 1-11, 27-32, 34-47, 63-67, 69-73, and 75-80 are rejected under 35 U.S.C. 102(b) as being anticipated by Yu et al. ("New Recursive Algorithm for Solving Linear Algebraic Equations").

Re claim 1, Yu et al. disclose a method for solving a system of N linear equations in N unknown variables (e.g. expression 1 in page 2069 wherein x is the unknown vector of variables), the method comprising: (a) storing an estimate value for each unknown variable (e.g. for performing in computer system and right column page 2070); (b) initialising each estimate value to a predetermined value (e.g. right column in page 2069 and the new cursive algorithm in right column page 2070 wherein the initial value is x_0);

(c) for each estimate value: (i) determining whether a respective predetermined condition is satisfied (e.g. from expression 8 to expression 11 in page 2070); and (ii) updating the estimate if and only if the respective predetermined condition is satisfied (e.g. step 2 in right column in page 2070); and (d) repeating step (c) until each estimate value is sufficiently close to an accurate value of the respective unknown variable (e.g. repeat the steps above for i = 1 to n as seen in page 2070).

Re claim 2, Yu et al. further disclose updating comprises adding a scalar value d to the respective estimate value, or subtracting a scalar value d from the respective estimate value (e.g. step 2 in right column in page 2070 wherein the right most term is the scalar value d).

Re claim 3, Yu et al. further disclose scalar value d is updated in a predetermined manner (e.g. accordingly to the new recursive algorithm as seen in page 2070).

Re claim 4, Yu et al. further disclose scalar value d is updated when and only when step (c) updates no estimate values (e.g. limited feedback loop in right column in page 2070).

Re claim 5, Yu et al. further disclose updating divides d by a scalar update value (e.g. z/z*z in right column page 2070).

Re claim 6, Yu et al. further disclose the scalar update value is equal to a power of two (e.g. by ai of matrix A).

Re claim 7, Yu et al. further disclose the scalar update value is equal to two (e.g. by ai of matrix A).

Re claim 8, Yu et al. further disclose each of estimate values is initialised to be equal to zero (e.g. x_0 is arbitrary).

Re claim 9, Yu et al. further disclose the respective predetermined condition for each respective estimate value does not involve the respective estimate value (e.g. expression 8 to the right column in page 2070 as the final solution is reached).

Re claim 10, Yu et al. further disclose the method establishes a respective auxiliary value for each estimate value (e.g. P_i corresponding to x_i).

Re claim 11, Yu et al. further disclose auxiliary values form an auxiliary vector Q (e.g. P_i corresponding to x_i).

Re claim 27, Yu et al. further disclose each estimate value is represented as a fixed point binary word (e.g. right column in page 2069).

Re claim 28, Yu et al. further disclose each estimate value is a floating point binary word (e.g. right column in page 2069).

Re claim 29, Yu et al. further disclose each estimate value is a complex number (e.g. right column in page 2069).

Re claim 30, Yu et al. further disclose the scalar value d is updated such that the algorithm updates the estimate values in a bitwise manner, beginning with the most significant bit (e.g. steps 1-3 in right column in page 2070).

Re claim 31, Yu et al. further disclose step (d) is carried out until a predetermined condition is satisfied (e.g. end of the loop).

Re claim 32, Yu et al. further disclose predetermined condition is a maximum number of iterations without an update to the scalar value d (e.g. looping for n times in page 2070).

Re claim 34, Yu et al. further disclose the accurate solution of the equations is known to lie between upper and lower bounds, and the algorithm seeks a solution between upper and lower bounds (e.g. inherently for any number).

Re claim 35, Yu et al. further disclose estimate values are initialised to a value which is within upper and lower bounds (e.g. inherently for any number).

Re claim 36, Yu et al. further disclose estimate values are initialised to a value positioned at the midpoint of upper and lower bounds (e.g. x_0 is set to be at 0).

Re claim 37, it is an apparatus claim of claim 1. Thus, claim 37 is also rejected under the same rationale as cited in the rejection of rejected claim 1.

Re claim 38, it is a data carrier claim of claim 1. Thus, claim 38 is also rejected under the same rationale as cited in the rejection of rejected claim 1.

Re claim 39, it has similar limitations cited in claim 4. Thus, claim 39 is also rejected under the same rationale as cited in the rejection of rejected claim 4.

Re claim 40, it has similar limitations cited in claim 2. Thus, claim 40 is also rejected under the same rationale as cited in the rejection of rejected claim 2.

Re claim 41, it has similar limitations cited in claim 5. Thus, claim 41 is also rejected under the same rationale as cited in the rejection of rejected claim 5.

Re claim 42, it has similar limitations cited in claim 6. Thus, claim 42 is also rejected under the same rationale as cited in the rejection of rejected claim 6.

Re claim 43, it has similar limitations cited in claim 7. Thus, claim 43 is also rejected under the same rationale as cited in the rejection of rejected claim 7.

Re claim 44, it has similar limitations cited in claim 8. Thus, claim 44 is also rejected under the same rationale as cited in the rejection of rejected claim 8.

Re claim 45, it has similar limitations cited in claim 4. Thus, claim 45 is also rejected under the same rationale as cited in the rejection of rejected claim 4.

Re claim 46, it has similar limitations cited in claim 10. Thus, claim 46 is also rejected under the same rationale as cited in the rejection of rejected claim 10.

Re claim 47, it has similar limitations cited in claim 11. Thus, claim 47 is also rejected under the same rationale as cited in the rejection of rejected claim 11.

Re claim 63, it has similar limitations cited in claim 27. Thus, claim 63 is also rejected under the same rationale as cited in the rejection of rejected claim 27.

Re claim 64, it has similar limitations cited in claim 28. Thus, claim 64 is also rejected under the same rationale as cited in the rejection of rejected claim 28.

Re claim 65, it has similar limitations cited in claim 29. Thus, claim 65 is also rejected under the same rationale as cited in the rejection of rejected claim 29.

Re claim 66, it has similar limitations cited in claim 31. Thus, claim 66 is also rejected under the same rationale as cited in the rejection of rejected claim 31.

Re claim 67, it has similar limitations cited in claim 32. Thus, claim 67 is also rejected under the same rationale as cited in the rejection of rejected claim 32.

Re claim 69, it has similar limitations cited in claim 34. Thus, claim 69 is also rejected under the same rationale as cited in the rejection of rejected claim 34.

Re claim 70, it has similar limitations cited in claim 35. Thus, claim 70 is also rejected under the same rationale as cited in the rejection of rejected claim 35.

Re claim 71, it has similar limitations cited in claim 36. Thus, claim 71 is also rejected under the same rationale as cited in the rejection of rejected claim 36.

Re claim 72, it is an apparatus claim of claim 39. Thus, claim 72 is also rejected under the same rationale as cited in the rejection of rejected claim 39.

Re claim 73, it is a data carrier claim of claim 39. Thus, claim 73 is also rejected under the same rationale as cited in the rejection of rejected claim 39.

Re claim 75, it is a computer processor claim of claim 1. Thus, claim 75 is also rejected under the same rationale as cited in the rejection of rejected claim 1.

Re claim 76, it is a computer processor claim of claim 2. Thus, claim 76 is also rejected under the same rationale as cited in the rejection of rejected claim 2.

Re claim 77, it is a computer processor claim of claim 6. Thus, claim 77 is also rejected under the same rationale as cited in the rejection of rejected claim 6.

Re claim 78, it is a computer processor claim of claim 7. Thus, claim 78 is also rejected under the same rationale as cited in the rejection of rejected claim 7.

Re claim 79, it has similar limitations cited in claim 3. Thus, claim 79 is also rejected under the same rationale as cited in the rejection of rejected claim 3.

Re claim 80, it is a computer processor claim of claim 1. Thus, claim 80 is also rejected under the same rationale as cited in the rejection of rejected claim 1.

Conclusion

13.   The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure.

a.   U.S. Patent No. 4,095,276 to Verkroost et al. disclose a digital signal processing

arrangement including a wave digital filter.

b.   U.S. Patent No. 6,611,597 to Futa et al. disclose a method and device for

constructing elliptic curves.

c.   U.S. Patent No. 7,171,564 to Kelley et al. disclose an universal password

generation method.

d.   U.S. Patent No. 6,826,585 to Mitsunaga et al. disclose a method and apparatus for

solving simultaneous linear equations.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Chat C. Do whose telephone number is (571) 272-3721. The

examiner can normally be reached on M => F from 7:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Meng-Ai An can be reached on (571) 272-3756. The fax phone number for the

organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chat C. Do
Examiner
Art Unit 2193

March 30, 2007